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09/446,560	12/22/1999	SADAYUKI ABETA	15689.51	2502

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EXAMINER	
ODOM, CURTIS B	

ART UNIT	PAPER NUMBER
2634	11

DATE MAILED: 04/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/446,560	ABETA ET AL.
	Examiner	Art Unit
	Curtis B. Odom	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amdt B filed on 2/4/03* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 February 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawahashi et al. (U.S. Patent No. 5, 694, 388) in view of Miki et al. (U.S. Patent No. 5, 724, 378).

Regarding claim 1, Sawahashi et al. discloses a receiver for receiving and demodulating a signal (column 1, lines 5-10) including a combined symbol sequence that has a plurality of slots and includes data symbols and pilot symbols (Fig. 3, column 2, lines 55-62), wherein a frame is a slot, the receiver comprising:

means for detecting positions of the pilot symbols in the combined symbol sequence (Fig. 14, block 161 and column 5, lines 19-26), wherein the phase error estimating/averaging block must detect the position of the pilot symbols to estimate the phase error ;

means for generating pilot blocks by extracting in a plurality of slots the pilot symbols from the combined symbol sequence in response to a result of the detection (Fig. 12,column 28, lines 32-37 and Fig. 14, block 161 and column 5, lines 19-26), wherein a symbol group is a pilot block;

means for obtaining channel estimation values by calculating a weighted sum of average values of the pilot symbols in the pilot blocks (Fig. 14, block 161 and column 5, lines 19-26);

means for acquiring from the combined symbol sequence a data symbol sequence in accordance with the result of the detection (Fig. 14, block 103T and column 5, lines 36-48), wherein the despread signal of the traffic channel is a data symbol sequence as a result of detection; and

means for compensating for channel fluctuations of the data symbol sequence using the channel estimation values (Fig. 14, block 162 and column 29, lines 1-21).

Sawahashi et al. does not disclose means for controlling the weighting in response to a rate of the channel fluctuations.

However, Miki et al. discloses a receiver for receiving and demodulating a signal comprising of channel estimators which obtain channel estimations based on pilot symbols (Fig. 3B, block 16, column 7, lines 22-32). Miki et al. also discloses that the factor used to control the weighting of the received pilot symbols can be the SIR of the paths, received signal levels of the paths, or estimated values of the amplitude fluctuations of due to fading (column 7, lines 53-63). These factors all pertain to a rate of the path (channel) fluctuation due to interference or fading. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the receiver of Sawahashi et al. with the teachings of Miki et al. because being able to measure and use the received channel fluctuations to weight the pilot symbols allows the receiver to cancel the channel fluctuations from the received symbols due to fading and interference with more accuracy. This allows for a more accurate recovery of the received symbols.

Regarding claim 2, which inherits the limitations of claim 1, Sawahashi et al. further discloses means for controlling the weighting comprises:

means for compensating for, using the channel estimation values, channel fluctuations of a pilot symbol sequence extracted from the combined symbol sequence (Fig. 6, block 128, column 24, lines 50-67 and column 25, 1-55);

means for generating an error signal from the compensated pilot symbol sequence and an ideal pilot symbol sequence (Fig. 6, block 124, column 24 lines 50-67 and column 25, lines 1-55); and

means for carrying out the weighting control using the error signal and the average values of the pilot symbols included in the pilot blocks (Fig. 14, block 110P, column 24 lines 50-67 and column 25, lines 1-55).

Regarding claim 3, which inherits the limitations of claim 1, Sawahashi et al. further discloses means for controlling the weighting comprises:

means for generating an error signal from the compensated data symbol sequence and from result obtained by demodulating and deciding the compensated data symbol sequence (Fig. 6, block 126, column 24 lines 50-67 and column 25, lines 1-55); and

means for carrying out the weighting control using the error signal and the average values of the pilot symbols included in the pilot blocks (Fig. 14, block 110P, column 24 lines 50-67 and column 25, lines 1-55).

Regarding claim 4, which inherits the limitations of claim 1, Sawahashi et al. further discloses means for controlling the weighting carries out the weighting control using as update values inner products of the channel estimation values of the data symbols and the average

values of the pilot symbols included in the pilot blocks (column 24 lines 50-67 and column 25, lines 1-55).

Regarding claim 5, which inherits the limitations of claim 1, Sawahashi et al. further discloses the receiver receives a signal including a combined symbol sequence having a frame structure consisting of slots in which the pilot symbols consisting of a few symbols are inserted into the data symbol sequence at every fixed interval (Fig. 3 and column 3, lines 55-63).

Regarding claim 6, which inherits the limitations of claim 1, Sawahashi et al. further discloses pilot blocks are formed from all the pilot symbols in a slot (Fig. 12 and column 28, lines 32-38), wherein pilot symbols in a pilot slot make up each symbol group and each symbol group is a pilot block.

Regarding claim 7, which inherits the limitations of claim 1, Sawahashi et al. further discloses when obtaining the channel estimation value of a data symbol in an n-th slot of the combined symbol sequence, where n is an integer, the pilot blocks are generated from an (n-K+1)-th slot to an (n+K)-th slot of the combined symbol sequence, where K is a natural number (Fig. 3 and column 2, lines 55-63), wherein the pilot blocks are generated from an (n-K+1)-th slot to an (n+K)-th slot of the combined symbol sequence, where K is a natural number.

Regarding claim 8, Sawashashi et al. discloses a for receiving and demodulating a signal including a data symbol sequence and a pilot symbol sequence parallel to the data symbol sequence (Fig.12), the receiver comprising:

means for generating a plurality of pilot blocks from the pilot symbol sequence (Fig. 12, column 28, lines 32-38);

means for obtaining channel estimation values by calculating a weighted sum of average values of the pilot symbols in the pilot blocks (Fig. 14, block 161 and column 5, lines 19-26); and

means for compensating for channel fluctuations of the data symbol sequence using the channel estimation values Fig. 14, block 162 and column 29, lines 1-21).

Sawahashi et al. does not disclose means for controlling the weighting in response to a rate of the channel fluctuations.

However, Miki et al. discloses a receiver for receiving and demodulating a signal comprising of channel estimators which obtain channel estimations based on pilot symbols (Fig. 3B, block 16, column 7, lines 22-32). Miki et al. also discloses that the factor used to control the weighting of the received pilot symbols can be the SIR of the paths, received signal levels of the paths, or estimated values of the amplitude fluctuations of due to fading (column 7, lines 53-63). These factors all pertain to a rate of the path (channel) fluctuation due to interference or fading. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the receiver of Sawahashi et al. with the teachings of Miki et al. because being able to measure and use the received channel fluctuations to weight the pilot symbols allows the receiver to cancel the channel fluctuations from the received symbols due to fading and interference with more accuracy and recover the received symbols without error caused by fluctuations and interference.

Regarding claim 9, which inherits the limitations of claim 8, Sawahashi et al. further discloses means for controlling the weighting comprises:

means for compensating for, using the channel estimation values, channel fluctuations of a pilot symbol sequence extracted from the combined symbol sequence (Fig. 6, block 128, column 24, lines 50-67 and column 25, 1-55);

means for generating an error signal from the compensated pilot symbol sequence and an ideal pilot symbol sequence (Fig. 6, block 124, column 24 lines 50-67 and column 25, lines 1-55); and

means for carrying out the weighting control using the error signal and the average values of the pilot symbols included in the pilot blocks (Fig. 14, block 110P, column 24 lines 50-67 and column 25, lines 1-55).

Regarding claim 10, which inherits the limitations of claim 8, Sawahashi et al. further discloses means for controlling the weighting comprises:

means for generating an error signal from the compensated data symbol sequence and from result obtained by demodulating and deciding the compensated data symbol sequence (Fig. 6, block 126, column 24 lines 50-67 and column 25, lines 1-55); and

means for carrying out the weighting control using the error signal and the average values of the pilot symbols included in the pilot blocks (Fig. 14, block 110P, column 24 lines 50-67 and column 25, lines 1-55).

Regarding claim 11, which inherits the limitations of claim 8, Sawahashi et al. further discloses means for controlling the weighting carries out the weighting control using as update values inner products of the channel estimation values of the data symbols and the average values of the pilot symbols included in the pilot blocks (column 24 lines 50-67 and column 25, lines 1-55).

Regarding claim 12, which inherits the limitations of claim 8, Sawahashi et al. further discloses the receiver receives a signal including a data symbol sequence which is spread using a first spreading code, and a pilot symbol sequence which is parallel to the data symbol sequence and spread using a second spreading code, the first spreading code and the second spreading code being orthogonal to each other (Fig. 12 and Fig. 13, column 28, lines 32-50), wherein the first spreading code and second spreading code are orthogonal in that orthogonal filters are used to despread the signal.

Regarding claim 13, which inherits the limitations of claim 8, Sawahashi et al. further discloses the receiver receives a signal including a spread data symbol sequence which is impressed on a first carrier, and a spread pilot symbol sequence which is parallel to the data symbol sequence and is impressed on a second carrier, the first carrier and the second carrier being orthogonal to each other (Fig. 12 and Fig. 13, column 28, lines 32-50), wherein the pilot symbol sequence and the data symbol sequence are separate and can be impressed on a carrier in orthogonal filters are used when the carriers are orthogonal to one another.

Regarding claim 14, which inherits the limitations of claim 8, Sawahashi et al. further discloses when obtaining the channel estimation value of an n-th data symbol in the data symbol sequence, where n is an integer, the plurality of pilot blocks are generated from an (nK+1)-th pilot symbol to an (n+K)-th pilot symbol in the pilot symbol sequence, where K is a natural number (Fig. 12 and column 28, lines 32-37), wherein a symbol group is a pilot block and the plurality of pilot blocks are generated from an (nK+1)-th pilot symbol to an (n+K)-th pilot symbol in the pilot symbol sequence, where K is a natural number.

Regarding claim 15, which inherits the limitations of claim 8, Sawahashi et al. further discloses the plurality of pilot blocks have a same length (Fig. 12, column 28, lines 32-37) wherein each symbol group contains the same amount of symbols.

Regarding claim 16, Sawahashi et al discloses a transceiver including a transmitting section for transmitting (column 3, lines 62-65) a signal including a combined symbol sequence that has a plurality of slots and includes data symbols and pilot symbols (Fig. 3, column 3, lines 62-67), and a receiving section for receiving and demodulating the signal (column 4, lines 3-4), the receiving section comprising:

means for detecting positions of the pilot symbols in the combined symbol sequence (Fig. 14, block 161 and column 5, lines 19-26), wherein the phase error estimating/averaging block must detect the position of the pilot symbols to estimate the phase error ;

means for generating pilot blocks by extracting in a plurality of slots the pilot symbols from the combined symbol sequence in response to a result of the detection (Fig. 12,column 28, lines 32-37 and Fig. 14, block 161 and column 5, lines 19-26), wherein a symbol group is a pilot block;

means for obtaining channel estimation values by calculating a weighted sum of average values of the pilot symbols in the pilot blocks (Fig. 14, block 161 and column 5, lines 19-26);

means for acquiring from the combined symbol sequence a data symbol sequence in accordance with the result of the detection (Fig. 14, block 103T and column 5, lines 36-48), wherein the despread signal of the traffic channel is a data symbol sequence as a result of detection; and

means for compensating for channel fluctuations of the data symbol sequence using the channel estimation values (Fig. 14, block 162 and column 29, lines 1-21).

Sawahashi et al. does not disclose means for controlling the weighting in response to a rate of the channel fluctuations.

However, Miki et al. discloses a receiver for receiving and demodulating a signal comprising of channel estimators which obtain channel estimations based on pilot symbols (Fig. 3B, block 16, column 7, lines 22-32). Miki et al. also discloses that the factor used to control the weighting of the received pilot symbols can be the SIR of the paths, received signal levels of the paths, or estimated values of the amplitude fluctuations of due to fading (column 7, lines 53-63). These factors all pertain to a rate of the path (channel) fluctuation due to interference or fading. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the receiver of Sawahashi et al. with the teachings of Miki et al. because being able to measure and use the received channel fluctuations to weight the pilot symbols allows the receiver to cancel the channel fluctuations from the received symbols due to fading and interference with more accuracy and recover the received symbols without error caused by fluctuations and interference.

Regarding claim 17, Sawahashi et al discloses a transceiver including a transmitting section for transmitting a signal including a data symbol sequence and a pilot symbol sequence parallel to the data symbol sequence (Fig. 12), and a receiving section for receiving and demodulating the signal, the receiving section comprising:

means for generating a plurality of pilot blocks from the pilot symbol sequence (Fig. 12, column 28, lines 32-38);

means for obtaining channel estimation values by calculating a weighted sum of average values of the pilot symbols in the pilot blocks (Fig. 14, block 161 and column 5, lines 19-26); and

means for compensating for channel fluctuations of the data symbol sequence using the channel estimation values Fig. 14, block 162 and column 29, lines 1-21).

Sawahashi et al. does not disclose means for controlling the weighting in response to a rate of the channel fluctuations.

However, Miki et al. discloses a receiver for receiving and demodulating a signal comprising of channel estimators which obtain channel estimations based on pilot symbols (Fig. 3B, block 16, column 7, lines 22-32). Miki et al. also discloses that the factor used to control the weighting of the received pilot symbols can be the SIR of the paths, received signal levels of the paths, or estimated values of the amplitude fluctuations of due to fading (column 7, lines 53-63). These factors all pertain to a rate of the path (channel) fluctuation due to interference or fading. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the receiver of Sawahashi et al. with the teachings of Miki et al. because being able to measure and use the received channel fluctuations to weight the pilot symbols allows the receiver to cancel the channel fluctuations from the received symbols due to fading and interference with more accuracy and recover the received symbols without error caused by fluctuations and interference.

Regarding claim 18, Sawahashi et al. discloses a receiving method of receiving and demodulating a signal including a combined symbol sequence that has a plurality of slots and includes data symbols and pilot symbols, the receiving method comprising the steps of:

detecting positions of the pilot symbols in the combined symbol sequence (Fig. 14, block 161 and column 5, lines 19-26), wherein the phase error estimating/averaging block must detect the position of the pilot symbols to estimate the phase error ;

generating pilot blocks by extracting in a plurality of slots the pilot symbols from the combined symbol sequence in response to a result of the detection (Fig. 12,column 28, lines 32-37 and Fig. 14, block 161 and column 5, lines 19-26), wherein a symbol group is a pilot block;

obtaining channel estimation values by calculating a weighted sum of average values of the pilot symbols in the pilot blocks (Fig. 14, block 161 and column 5, lines 19-26);

acquiring from the combined symbol sequence a data symbol sequence in accordance with the result of the detection (Fig. 14, block 103T and column 5, lines 36-48), wherein the despread signal of the traffic channel is a data symbol sequence as a result of detection; and

compensating for channel fluctuations of the data symbol sequence using the channel estimation values (Fig. 14, block 162 and column 29, lines 1-21).

Sawahashi et al. does not disclose the weighting is controlled in response to a rate of the channel fluctuations.

However, Miki et al. discloses a receiver for receiving and demodulating a signal comprising of channel estimators which obtain channel estimations based on pilot symbols (Fig. 3B, block 16, column 7, lines 22-32). Miki et al. also discloses that the factor used to control the weighting of the received pilot symbols can be the SIR of the paths, received signal levels of the paths, or estimated values of the amplitude fluctuations of due to fading (column 7, lines 53-63). These factors all pertain to a rate of the path (channel) fluctuation due to interference or fading. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention

was made to modify the receiver of Sawahashi et al. with the teachings of Miki et al. because being able to measure and use the received channel fluctuations to weight the pilot symbols allows the receiver to cancel the channel fluctuations from the received symbols due to fading and interference with more accuracy and recover the received symbols without error caused by fluctuations and interference.

Regarding claim 19, Sawahashi et al. discloses a receiving method of receiving and demodulating a signal including a data symbol sequence and a pilot symbol sequence parallel to the data symbol sequence, the receiving method comprising the steps of:

generating a plurality of pilot blocks from the pilot symbol sequence (Fig. 12, column 28, lines 32-38);

obtaining channel estimation values by calculating a weighted sum of average values of the pilot symbols in the pilot blocks (Fig. 14, block 161 and column 5, lines 19-26);

compensating for channel fluctuations of the data symbol sequence using the channel estimation values Fig. 14, block 162 and column 29, lines 1-21),

Sawahashi et al. does not disclose the weighting is controlled in response to a rate of the channel fluctuations.

However, Miki et al. discloses a receiver for receiving and demodulating a signal comprising of channel estimators which obtain channel estimations based on pilot symbols (Fig. 3B, block 16, column 7, lines 22-32). Miki et al. also discloses that the factor used to control the weighting of the received pilot symbols can be the SIR of the paths, received signal levels of the paths, or estimated values of the amplitude fluctuations of due to fading (column 7, lines 53-63). These factors all pertain to a rate of the path (channel) fluctuation due to interference or fading.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the receiver of Sawahashi et al. with the teachings of Miki et al. because being able to measure and use the received channel fluctuations to weight the pilot symbols allows the receiver to cancel the channel fluctuations from the received symbols due to fading and interference with more accuracy and recover the received symbols without error caused by fluctuations and interference.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 703-305-4097. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-6743 for regular communications and 703-308-6743 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Curtis Odom
April 4, 2003

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